BONE DEFORMITY IDENTIFICATION USING MACHINE LEARNING

VISHNU.K

MES20MCA-2059

PRODUCT OWNER –NOWSHAD.CV

TABLE OF CONTENTS

INTRODUCTION

The success of machine learning algorithms in medical imaging has increased the need for artificially trained models to make them work in the medical field more quickly and efficiently. This paper gives a technique to identify bone fracture using machine learning algorithms, by which workload for orthopedics can be reduced. The significant use of machine learning in this era of big medical data would help gather information from the available x-ray images rather than spending hours in the radiology departments. This Project presents imaging technologies used to identify bone fracture in the human body and give quick results once the x-ray has been taken. The Main Modules are Admin and user.

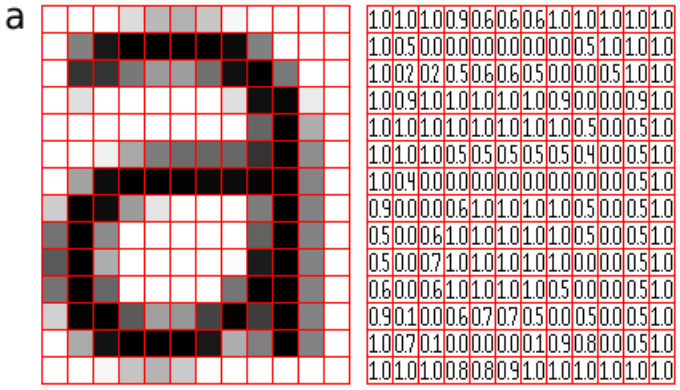
MACHINE LEARNING

Machine learning (ML) is the study of computer algorithms that can improve automatically through experience and by the use of data. It is seen as a part of artificial intelligence. Machine learning algorithms build a model based on sample data, known as training data, in order to make predictions or decisions without being explicitly programmed to do so. Machine learning algorithms are used in a wide variety of applications, such as in medicine, email filtering, speech recognition, and computer vision, where it is difficult or unfeasible to develop conventional algorithms to perform the needed tasks.

A subset of machine learning is closely related to computational statistics, which focuses on making predictions using computers; but not all machine learning is statistical learning. The study of mathematical optimization delivers methods, theory and application domains to the field of machine learning. Data mining is a related field of study, focusing on exploratory data analysis through unsupervised learning.

CNN ALGORITHM

A Convolutional Neural Network, also known as CNN or ConvNet, is a class of neural networks that specializes in processing data that has a grid-like topology, such as an image. A digital image is a binary representation of visual data. It contains a series of pixels arranged in a grid-like fashion that contains pixel values to denote how bright and what color each pixel should be.



The human brain processes a huge amount of information the second we see an image. Each neuron works in its own receptive field and is connected to other neurons in a way that they cover the entire visual field. Just as each neuron responds to stimuli only in the restricted region of the visual field called the receptive field in the biological vision system, each neuron in a CNN processes data only in its receptive field as well. The layers are arranged in such a way so that they detect simpler patterns first (lines, curves, etc.) and more complex patterns (faces, objects, etc.) further along. By using a CNN, one can enable sight to computers.

MODULES

❖ **ADMIN**

1. Login
2. Data set management
3. View users
4. Feedbacks
5. View prediction results

❖ **USER**

1. Register
2. Login
3. Upload image
4. View prediction
5. Feedback

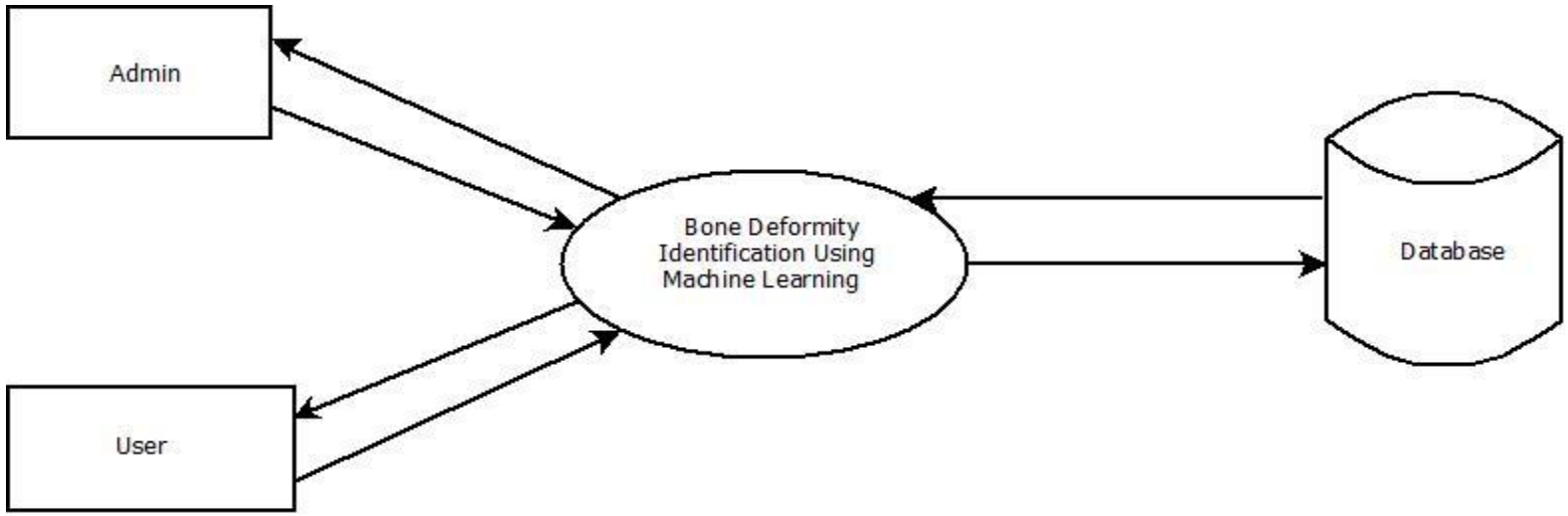
FUTURE ENHANCEMENTS

To identify bone fracture using machine learning algorithms, by which workload for orthopedics can be reduced.

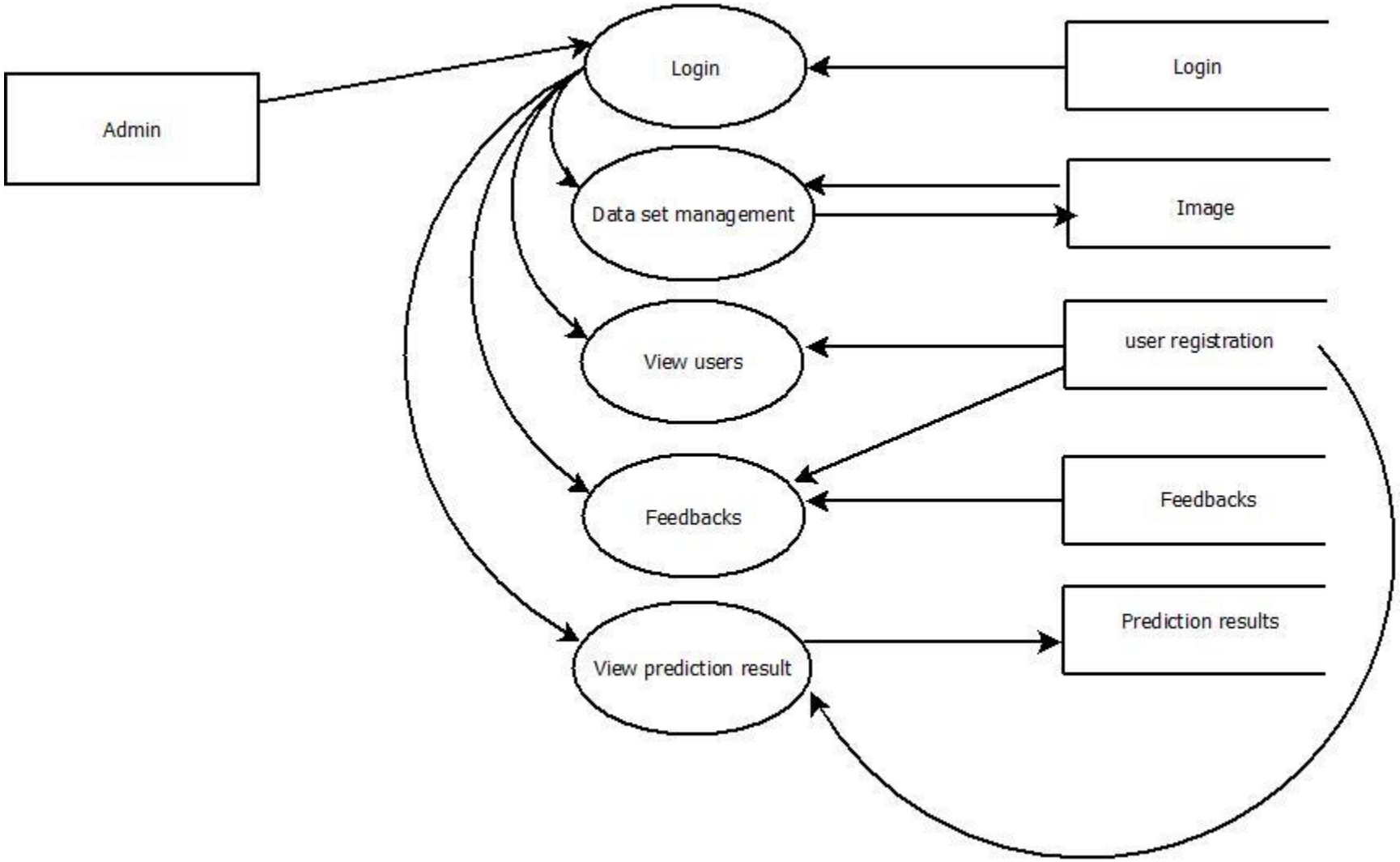
It is applicable to all age groups of men, women and children. It provides a summarized and evaluated results of any detected deformity or fracture based on the x-ray images.

DATA FLOW DIAGRAM

LEVEL-0



LEVEL-1.1


Admin
Login
Login
Data set management
Image
View users
user registration
Feedbacks
Feedbacks
View prediction result
Prediction results

LEVEL-1.2

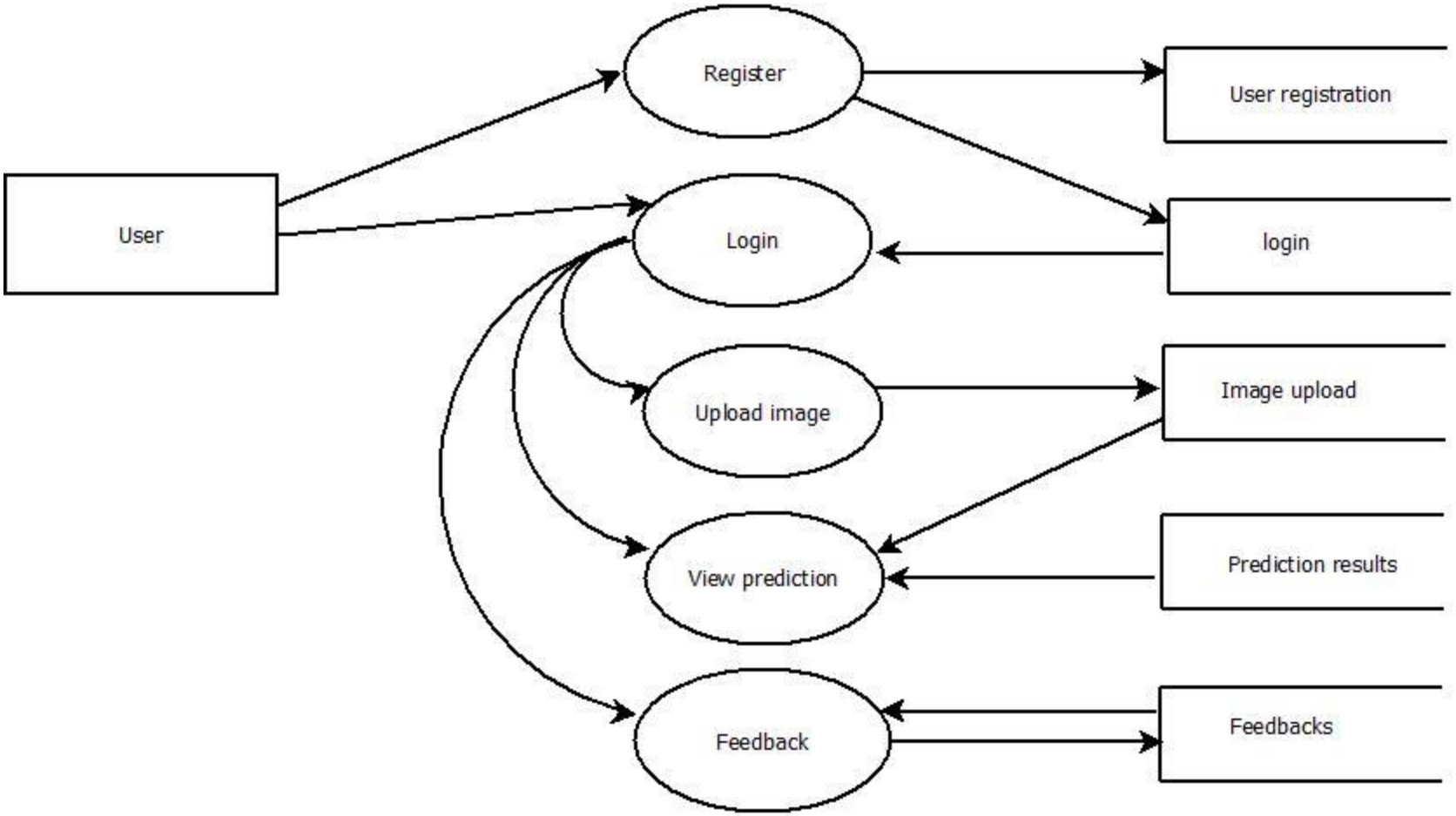

User
Register
Login
Upload image
View prediction
Feedback
User registration
login
Image upload
Prediction results
Feedbacks

TABLE DESIGN

USER REGISTRATION

	Field	Type	Comment
🔑	id	int(11) NOT NULL	
	lid	int(11) NULL	
	firstname	varchar(200) NULL	
	lastname	varchar(200) NULL	
	gender	varchar(200) NULL	
	place	varchar(200) NULL	
	post	varchar(200) NULL	
	pin	int(11) NULL	
	phone	bigint(20) NULL	

LOGIN

	Field	Type	Comment
🔑	id	int(11) NOT NULL	
	username	varchar(100) NULL	
	password	varchar(100) NULL	
	type	varchar(100) NULL	

DEVELOPING ENVIRONMENT

- **Hardware Requirements**

  - Input Device :Mouse , Keyboard
  - Output Device :Monitor
  - Memory :3 Gb(Minimum)
  - Processor :Intel Pentium Core i3 and above, 64 bits

- **Software Requirements**

  - Operating System :WINDOWS 10(Better Performance)
  - Front End :Html,Css,JavaScript
  - Back End :Mysql
  - IDE Used :JetbrainsPycharm
  - Technology Used :Python
  - Frame Work Used :Flask

PRODUCT BACKLOG

User Story ID	Priority <High/Medium/Low>	Size (Hours)	Sprint <#>	Status <Planned/In progress/Completed>	Release Date	Release Goal
1	Medium	2	1	Completed	08/01/2022	Table design
2	High	3		Completed	08/01/2022	Form design
3	High	5		Completed	08/01/2022	Basic coding
4	High	5	2	Completed	16/01/2022	Creation data set
5	Medium	5		Completed	22/01/2022	Preprocessing
6	High	5	3	Completed	27/01/2022	Training
7	Medium	5		Completed	05/02/2022	Prediction
8	Medium	5	4	Completed	10/02/2022	Testing data
9	High	5		Completed	19/02/2022	Output generation

USER STORY

UserStoryID	As a <type of user>	I want to	So that I can
1	Admin	Login	Login successful with correct username and password
2	Admin	View user	View users
3	Admin	View feedback	View users feedback
4	Admin	Data set management	Add and manage images in dataset
5	Admin	View prediction result	View prediction result from user
6	User	Registration	Registration by given user details
7	User	Login	Login by using username and password
8	User	Upload image	Upload image for prediction
9	User	View prediction result	View result of uploaded image
10	User	Feedback	Send feedback

PROJECT PLAN

User Story ID	Task Name	Start Date	End Date	Days	Status
1	Sprint 1	26/12/2021	28/12/2021	2	Completed
2		29/12/2021	31/12/2021	3	Completed
3		03/01/2022	08/01/2022	5	Completed
4	Sprint 2	09/01/2022	16/01/2022	8	Completed
5		18/01/2022	22/01/2022	5	Completed
6	Sprint 3	23/01/2022	27/01/2022	5	Completed
7		30/01/2022	05/02/2022	7	Completed
8	Sprint 4	06/02/2022	10/01/2022	5	Completed
9		16/02/2022	19/02/2022	4	Completed

SPRINT BACKLOG

Backlog Item	Status & completion date	Original estimate in hours	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10	Day11	Day12	Day13	Day14
User story #1,#2,#3		hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs
Table design	28/12/2021	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Form design	31/12/2021	3	0	0	0	1	1	1	0	0	0	0	0	0	0	0
Coding	08/01/2021	5	0	0	0	0	0	0	0	0	0	1	1	1	1	1
User story #4,#5																
Creation dataset	16/01/2022	5	1	1	0	1	0	1	0	1	0	0	0	0	0	0
Preprocessing	22/01/2022	5	0	0	0	0	0	0	0	0	0	1	1	1	1	1
User story #6,#7																
Training	27/01/2022	5	1	1	1	1	1	0	0	0	0	0	0	0	0	0
Prediction	05/02/2022	5	0	0	0	0	0	0	0	1	0	1	1	1	0	1
User story #8,#9																
Testing data	10/02/2022	5	1	1	1	1	1	0	0	0	0	0	0	0	0	0
Output generation	19/02/2022	5	0	0	0	0	0	0	0	0	0	2	1	1	1	1
Total		40	4	4	2	4	3	2	0	2	0	5	4	4	3	4

SPRINT ACTUAL

Backlog Item	Status & completion date	Original estimate in hours	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10	Day11	Day12	Day13	Day14
User story #1,#2,#3		hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs
Table design	28/12/2021	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Form design	31/12/2021	3	0	0	0	1	1	1	0	0	0	0	0	0	0	0
Coding	08/01/2021	5	0	0	0	0	0	0	0	0	0	1	1	1	1	1
User story #4,#5																
Creation dataset	16/01/2022	5	1	1	0	1	0	1	0	1	0	0	0	0	0	0
Preprocessing	22/01/2022	5	0	0	0	0	0	0	0	0	0	1	1	1	1	1
User story #6,#7																
Training	27/01/2022	5	1	1	1	1	1	0	0	0	0	0	0	0	0	0
Prediction	05/02/2022	5	0	0	0	0	0	0	0	1	0	1	1	1	0	1
User story #8,#9																
Testing data	10/02/2022	5	1	1	1	1	1	0	0	0	0	0	0	0	0	0
Output generation	19/02/2022	5	0	0	0	0	0	0	0	0	0	2	1	1	1	1
Total		40	4	4	2	4	3	2	0	2	0	5	4	4	3	4

THANK YOU